In the Claims:

1. (previously presented) A method of regulating a response of a voice coil motor plant comprising steps of:

(a) selecting an ideal response representative of a frequency response characteristic of an ideal voice coil motor plant;

(b) measuring an actual response of the voice coil motor plant to one or more sinusoid signal(s), each at a predetermined frequency, wherein the actual response exhibits one or more unwanted resonance mode(s) that are not found in the ideal response; and

(c) realizing an equalization filter for offsetting the one or more unwanted resonance mode(s) based on the ideal response and the actual response.

2. (original) The method of claim 1 wherein the realizing step (c) comprises a step of:

(c)(1) dividing a value corresponding to the ideal response by a value corresponding to the actual response to yield an equalized response value that is characteristic of an equalized response.

3. (original) The method of claim 2 further comprising steps of:

(c)(2) deriving an equalization transfer function based on the equalized response value.

4. (original) The method of claim 2 further comprising:

(d) storing the equalized response value;

(e) repeating steps (a)-(d) to create a plurality of stored equalized response values;

(f) fitting the equalized response values to a curve; and

(g) deriving an equalization filter transfer function based on the fitted curve.

5. (previously presented) The method of claim 1 further comprising steps of:

(d) storing parameters for the equalization filter in a storage device to filter a control signal from a servo controller.

6. (previously presented) The method of claim 1 further comprising steps of:

(d) realizing an equalization filter associated with each of a plurality of transducer heads in a servo control loop of a storage device.

7. (original) The method of claim 6 further comprising steps of:

(e) storing parameters for each of the equalization filters;

(f) sending a control signal to the voice coil motor plant to position one of the transducer heads over a target location; and

(g) filtering the control signal with the one of the equalization filters associated with the one of the transducer heads.

8. (previously presented) A storage device having a servo control module and an actual voice coil motor (VCM) plant, the disc drive comprising:

memory storing predetermined ideal VCM plant response parameters representing a response of an ideal VCM plant for which the servo control module is designed to interact;

a measuring module operable to measure an actual VCM plant response representing the response of the actual VCM plant to a control signal; and

a realizing module operable to generate an equalization filter for filtering one or more resonance mode(s) that are in the actual VCM plant response but are not in the ideal VCM plant response.

9. (original) The disc drive of claim 8 wherein in the equalization filter comprises a transfer function comprising a combination of values in the actual VCM plant response and values in the ideal VCM plant response.

10. (original) The disc drive of claim 8 wherein the actual VCM plant comprises one or more transducer head(s), each exhibiting a unique head response that contributes to the plant response, the disc drive further comprising:

an equalization filter associated with each of the one or more head(s) to counteract one or more non-ideal resonance mode(s) in each of the unique head responses, such that the combination of the equalization filter response and the actual VCM plant response for all heads is substantially ideal.

11. (original) The disc drive of claim 10 wherein one of the heads exhibits a head response having a first resonance mode at a first frequency within a first zone and a second resonance mode at a second frequency in a second zone, the first and second resonance modes being different, the disc drive further comprising a first equalization filter equalizing the first resonance mode coupled to the head when the head is positioned in the first zone, and a second equalization filter equalizing the second resonance mode coupled to the head when the head is positioned in the second zone.

12. (original) The disc drive of claim 8 wherein the equalization filter is a discrete-time domain filter defined by state-space variables.

13. (original) The disc drive of claim 12 wherein the ideal VCM plant response has an analytical form:

$$\widetilde{P}(z) = e^{-z\tau} \frac{\widetilde{K}}{z^2} \frac{\widetilde{w}^2}{z^2 + 2\widetilde{\xi}\widetilde{w}\ z + \widetilde{w}^2},$$

14. (previously presented) A storage device having a servo controller generating a control signal to a voice coil motor (VCM) plant exhibiting response to a control signal, the storage device comprising:

a demodulator receiving a head motion signal from the VCM plant and generating a position error signal (PES);

a means for equalizing variation in the PES based on an ideal response for which the servo controller is designed.

15. (previously presented) The storage device of claim 14 wherein the means for equalizing the response comprises:

an equalization filter having an equalizing transfer function that is a combination of a plant transfer function of the VCM plant and an ideal transfer function of an ideal VCM plant model.

16. (previously presented) The storage device of claim 15 further comprising an equalization filter for each of a plurality of transducer heads in the storage device.

17. (previously presented) The storage device of claim 16 wherein the ideal response has the analytical form:

$$\tilde{P}(z) = e^{-z\tilde{T}} \frac{\tilde{K}}{z^2} \frac{\tilde{w}^2}{z^2 + 2\tilde{\xi}\tilde{w}\ z + \tilde{w}^2},$$

wherein $\tilde{K}$ is a desired DC gain, $\tilde{T}$ is a computational/electronics delay factor, $\tilde{\xi}$ is a desired damping ratio, and $\tilde{w}$ is a desired natural frequency.

18. (previously presented) A method of controlling a transducer head comprising steps of:

(a) inputting actual voice coil motor plant response values representing a frequency response of an actual VCM plant to one or more sinusoidal signal(s), each at a predetermined frequency;

(b) inputting ideal VCM plant model values representing a frequency response of an ideal VCM plant to one or more sinusoidal signal(s), each at the predetermined frequency;

(c) determining relative differences between the ideal VCM plant model values and the actual VCM plant values at each of the predetermined frequencies; and

(d) realizing an equalization filter that when working in combination with the actual VCM plant, the combination yields a response that is substantially equal to the ideal VCM plant model response.

19. (original) The method of claim 18 wherein the determining step (c) comprises a step of:

(c)(l) dividing each of the ideal VCM plant model values with an associated actual VCM plant value to yield a plurality of equalization values.

20. (original) The method of claim 19 wherein the realizing step comprises steps of:

(d)(1) fitting the equalization values to a curve;

(d)(2) deriving an analytical function that defines the curve; and

(d)(3) storing parameters associated with the analytical function to be used during operation as the equalization filter.

21. (previously presented) The method of claim 20 further comprising steps of:

(e) determining whether an equalization filter has been realized for each of a plurality of transducer heads in a storage device; and

(f) if an equalization filter has not been realized for each of a plurality of transducer heads, switching to a next head and repeating steps (a) through (d) for the next head.